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ABSTRACT

An environmental assessment for postsecondary education planning by the Colorado Commission on Higher Education is presented, with a focus on emergent issues and trends in education, and demographic and economic forecasts to the year 2000. Demographic issues include: population size and distribution, age shifts, race and ethnicity, and population mobility and migration. Information is included on: 1980 census enrollment counts for Colorado for nursery school through high school versus postsecondary school, and by sector (public and private); enrollment counts for Coloradans, age 19 and older, in metropolitan and nonmetropolitan areas; and regional distinctions in enrollment. Also considered are the following issues and trends in public postsecondary education: equity considerations, performance expectations, levels and types of services, needs for long-range planning, funding for public goods, public willingness to invest in postsecondary education, and support from within education. Data are included on: actual and projected population growth, 1970-2000; projected population counts by ethnic group, 1980-2010; and occupational distribution of Colorado civilian nonagricultural employment, 1975, 1985, 1995. (SW)

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APPROACHING A NEW MILLENNIUM:

THE ENVIRONMENTAL CONTEXT AND PLANNING CONSIDERATIONS

FOR COLORADO POSTSECONDARY EDUCATION

An Environmental Assessment
prepared for the
Colorado Commission on Higher Education

February, 1987

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INTRODUCTION

Environmental factors such as demographics, economics and public sentiment inevitably influence education planning and policy. Similarly, circumstances and trends within education have influence. This environmental assessment summarizes factors of special relevance to the postsecondary education planning efforts of the Colorado Commission on Higher Education (CCHE). The assessment is forward-looking. Emergent issues and trends in education are highlighted, together with demographic and economic forecasts to the year 2000. Based in trend extrapolation, these suggest images of the probable future.

There is also potential for a future that is somewhat different than some current trends and forecasts would imply. Human ideals and intentions have been powerful forces in shaping the present. In recognition of CCHE's responsibility to promote changes which are aimed at educational improvements, the assessment alludes to potential areas for policy intervention.

Functions, Focus and Organization of the Assessment

Environmental assessment is a component of the total planning and policy formulation process. Figure 1 illustrates the dynamics of the process and the functions of environmental analysis. As noted in the model, environmental factors imply citizen <u>needs for education</u> and <u>needs of education</u> as well. Action plans (including objectives and the means to achieve them) flow from insights gained during the environmental assessment phase. Evaluative judgments are made in each phase, and especially after action plans and policy have been implemented. These evaluations can reinforce or cause change in the assumptions we make about the purposes of education and appropriate roles and missions for educational agencies and institutions. The model shows the sequential phases of the planning process; in reality the phases are blurred, often occurring almost simultaneously. This happens because the continuous interaction between education and society require that planning efforts also be continuous, and because planning is done in different education sectors, within many organizations, and at several levels.

The CCHE has special responsibility and authority for state-level, public-sector postsecondary education planning and policy. As shown in Figure 2, this environmental assessment focuses on public postsecondary education in the primary context of Colorado. Comments on national and international matters and notes about regional, local and institutional concerns are included when they are relevant to state-level planning for postsecondary education. Attention is also given to areas where public postsecondary education, the public K-12 school system and private-sector education share overlapping concerns. Illustrated in another way, Figure 3 emphasizes the target of this assessment.

The report highlights environmental considerations thought to be especially relevant to CCHE planning and policy. It is intended to complement other environmental information which has been recently reported to the CCHE (e.g., CCHE Roundtable Reports, J. Bartram's environmental scan for the University of Colorado).

As noted in the table of contents, the report is organized under several headings. The narrative in each section is presented in short summary paragraphs. It reflects a synthesis of data and information from many sources, together with general planning implications. Additional data, explanations and source notes are included in figures, tables, endnotes and appendices. Figures and tables are attached at the end of the report and appear in the order in which they are referenced in the text. Because of their length, appendices are not included here; they are available for review at CCHE. Data and reference documents contained in the appendices may be especially useful later in the planning process when specific action plans are considered by the Commission.

A TIME OF TRANSITION: EDUCATION IN THE POST-INDUSTRIAL ERA

The familiar underpinnings of the industrial age are rapidly giving way as we move into a new age that is anticipated to be dependent on creative use of information and high technology. The course we are traveling is largely uncharted, but many believe that changes associated with the new age will be more profound and far-reaching than those attributed to the Industrial Revolution. As importantly, the rate of change--both to accommodate and to attempt to shape the future--is more rapid than before [1].

This is a complex era, one which presents both challenges and opportunities for education--especially for postsecondary education. There are population pressures abroad, and important demographic changes are occurring in our nation. It is increasingly evident that the world has limited resources, and that individuals and their natural, socio-political and economic environments are interdependent. While growth slows in other sectors, the service sector of the U.S. economy is expanding, yet much of that growth is being attributed to entry-level, minimum-skill jobs. Rapid developments in technology and international competition are contributing to job obsolescence. Expectations that a job or career will last a life-time are proving to be unrealistic. A number of other assumptions are being questioned--among them, the assumption that education during youth is sufficient for life.

Historically, U.S. education has been expected to perform several important--and seemingly incongruous--functions. It has been expected to promote stability and cultural continuity and it has also been expected to provide the knowledge, creativity and leadership that promotes change. In slower-paced and less complex times these two functions of American education have cycled rather noticeably, with emphases on stability tending to be followed by emphases on change--change which is then adjusted and reacted to

through renewed emphases on stability [2]. Cross-cutting these, a second set of functions has also been expected of education: it has been expected to serve the interests of individuals and those of larger society. These two functions of education have also tended to cycle, with emphases on societal concerns being followed by emphases on individual/personal concerns, etc. [3].

But circumstances of the post-industrial era are not so amenable to "swings of the pendulum" [4]. Rather, education is faced with the challenge of promoting knowledge, creativity and leadership to meet individual and societal needs of the present and the future, while at the same time providing an atmosphere that promotes enough stability and order that individual and collective freedoms and well-being are maintained. Faced with the need to perform these functions simultaneously--and to do so within the constraints of limited budgets--it is not surprising that education is the focus of much attention and controversy today.

The post-industrial era also presents great opportunity for postsecondary education. The era and the coming age of information and high technology both demand and are dependent upon the major forte of education-- i.e., the development and nurturance of human capital. Intellectual advances, creative application of knowledge, and the promotion of human caring and consideration are not only strengths of education, they are the chief sources of optimism for the future.

Our nation's founders anticipated future needs for education and educated persons, defining them as among a few "public goods" thought necessary to assure the welfare of individual citizens and their society. Transitionary challenges of the present era and anticipated demands of the new age suggest that the development of human capital is probably more important now than ever before. But changes in education are also implied, and forecasts for the foreseeable future suggest that, however important, education must increasingly be considered in the context of demands for a wide variety of other public services.

DEMOGRAPHIC CONSIDERATIONS

Population Size

Forecasts of the Demographic Section of the Colorado Division of Local Government (State Demographer) show that the Colorado population will continue to expand, but because of declines in net migration, the rate of growth will be slower than in the 1970's and early '80's. The annual growth rate of 2.6% for 1980 is estimated to have dropped to 1.7% in 1985, and is projected to decline to 1.5% by the end of the century. Evenso, projections show Colorado population numbers increasing by about 29% between 1985 and 2000, with the population reaching 3.5 million by 1990 and exceeding 4 million by 2000 (Figure 4). (For notes on forecasting assumptions, see Endnote [5]. Appendix A contains projections data tables.)

Population Distribution

The State Demographer frequently refers to five regions in Colorado (map, Figure 5). Historically, there has been considerable difference in population size and growth patterns among regions (Figure 6a-b). Differential patterns of population change within the state are expected to continue. Greatest growth in population numbers is expected along the Front Range, West Slope and Eastern Mountains. The East Plains and San Luis Valley may show slight declines in population size over the same period. (See Appendix A for regional and county population projections.) Such uneven growth suggests that the relationship between postsecondary education and community/economic development will continue to be an issue, as will such matters as rural access to educational opportunity and rural vs. urban resource allocations.

Age Shifts

With the aging of the baby boom population and the related slowing of migration, the median age of the Colorado population rose from 28.6 years (1980 Census) to an estimated 30 years in 1985; it is projected to reach 34 years by 2000 (Appendix A). Yet, because of high levels of in-migration of younger adults in the 1970's and early 1980's, the Colorado population should continue to be slightly younger than the nation's population for several more years (median age of the U.S. population was 30 years in 1980).

As we approach the new millennium, the influence of the aging of the baby boomers coupled with the trend of smaller family size will be especially significant for postsecondary education planning. Anticipated age shifts show proportions of children and older adults holding fairly constant while the proportion of middle-age adults increases and proportions of younger adults decline (Figure 7 and Appendix A).

Enrollment planning will be complicated because as baby boomers grow older and are followed by smaller age cohorts, the age pool from which postsecondary students have traditionally come is declining. And while some see older adults as a new pool from which to draw, there are questions of whether large numbers of them will choose to participate in postsecondary programs [6]. There are also implications for public support of education because baby boomers will have needs for other public services as they age and because, being so large, the cohort has potential for strong influence on public policy. (Age-specific population forecasts for 20 county/multi- county areas of Colorado are included in Appendix B-1. Enrollment outlooks based on these forecasts are included in Appendices B-2 and B-3. An article on political implications of Colorado age shifts is included in Appendix C.)

Race and Ethnicity

Continuing earlier trends, the coming decades are expected to show increased racial and ethnic heterogeneity in the Colorado population. Projections of the State Demographer show that minorities (i.e., Hispanics

and non-Whites) will represent about one-fifth of Colorado's population at the turn of the century (Figure 8 and Appendix D-1).

Population estimates for 1985 showed about 18% of the state's population to be of minority background (12% Hispanic, 4% Black, 1% Asian, .7% Native American) (Appendix D-1, Table 2). Minority representation varies considerably by county, with greatest numbers living along the Front Range (Appendix D-2). Minorities are concentrated in greatest proportions in several Front Range counties (e.g., Pueblo, Denver, Adams) and in southern counties of the San Luis and Lower Arkansas Valleys. In 1980 over one-third of the population in several of these counties was of minority background.

As with age shifts, the increasing ethnic heterogeneity of the population has implications for planning--both in terms of anticipating needs for educational services, and in terms of public support of education. (Appendices D-3 and D-4 contain articles on policy implications of age and ethnicity shifts.)

Population Mobility and Migration

Net migration has had significant influence in Colorado in recent years. Figure 9 shows the extent to which net migration has contributed to statewide population growth since 1960. In the late '60's, the '70's and early '80's net migration often contributed more to growth than did natural increase (i.e., births minus deaths). This is to say that during that period many more people moved into Colorado ("in-migrants") than moved away ("out-migrants").

But the influence of net migration declined sharply over the past two years, and this slowing may become a longer-term trend. The propensity to migrate tends to be age-specific, favoring younger adults (especially those with high levels of education and skilled or professional occupations). With many of the baby boomers now well into their 30's, settled in their community with job and family, they are less likely to move. Related, economic "push and pull" forces which tend to encourage migration (i.e., differences in job opportunities, cost of living, etc. that make one place more attractive than another) need to be fairly strong to cause people to move--especially people in mid-life. Colorado's economy was considerably stronger than the nation's in the past, but it has since slowed to more closely resemble many other states--which means that push-pull factors are less compelling. (Of course, relative economic circumstances can change rather quickly; Colorado's economic forecast is the topic of the next section.)

As discussed in a recent article in Population Analyses for Colorado Educators (PACE), net migration is one of three components of population change (along with births and deaths) and is often used as an indicator of population mobility. However, net migration understates actual movement of people in and out of an area because it does not account for population exchanges (i.e., newcomers replacing people who have died or moved away). This total coming and going of people is referred to as "turnover" migration [7]. Comparison of net and turnover migration rates for three Colorado towns show that population turnover was substantial during the decade of the 1970's,

especially in rapidly growing communities, but also in stable places. Of particular interest here is that in the one community with seemingly consistent patterns of population stability, the ratio of changed households to net increase was 8:1 (i.e., eight households were exchanged for each net increase of one household). In that town only one-half of the 1970 households remained by 1980 although the town had shown a 10% net increase in total households, 1970 to 1980 (which is an annual growth rate of less than 1% per year). We can speculate that since the mid-1980's turnover migration is probably slowing for the same reasons as net migration, however we cannot assume that Colorado has as few newcomers as recent net figures indicate. (Articles on net and turnover migration, and their educational implications, are included in Appendix E.)

ECONOMIC AND EMPLOYMENT TRENDS

The Center for Economic Analysis (CEA), University of Colorado-Boulder, has recently provided projections of economic growth (defined as an increase in jobs) through the year 1995. Based on current trends and policy, the projections take into account such factors as demographics, international trade and oil prices, interest rates, industrial trends, and Colorado's situation relative to other states. The CEA's general economic forecast for Colorado is summarized below, with notes on basic underlying assumptions included in Endnote [8]. Appendix F contains detailed forecasts of the CEA.

CEA forecasts for Colorado show uneven growth between 1986 and 1995 and do not anticipate a return to high growth rates of the latter half of the 1970's (Figure 10). The slow growth rates of 1985 and 1986 (about 1.6% each year) are expected to rise to about 2.6% in 1987, and because of a national slowdown, decline some in 1988 (2.1%) and more in 1989 (.9%). Because national economic recovery is expected near the end of the decade, Colorado's growth rate is likely to accelerate in 1990 (to over 4%) and then to slow again (to about 2% by 1995). CEA notes several key factors underlying its forecasts, including: improvements in computer, electronics and instruments industries; aerospace and defense sector growth; continued positive effects from the drop in oil prices; and additional expanding of financial, business and professional services.

Relative to the U.S., Colorado's current growth rate is about the same as the nation's. From 1987 through 1990 Colorado's economy is expected to outperform the U.S. economy. Between 1991-95 Colorado and U.S. growth rates are expected to be similar. Within Colorado, Front Range counties (including Pueblo) and ski counties are expected to show economic growth rates similar to state averages; other counties' growth rates are expected to be lower.

Anticipated changes in non-agricultural civilian employment, by occupational category, are noted in Table 1a-b. Compared to 1985 figures, 1995 forecasts show job growth in all occupational categories (Table 1a), but that growth is less than during the period 1975-85. Continuing earlier trends, 1995 forecasts show over 50% of employment in three occupational

categories: managers and administrators (12%), clerical and kindred workers (21%) and cleaning, food, personal and protective service (19%). In relative terms, when employment change 1975-85 is compared with forecasts for 1985-95, greatest growth is anticipated in the health professions and in the occupational category encompassing cleaning, food, personal and protective service workers. At the same time, job growth is expected to slow considerably in construction, crafts and operative occupations (Table 1b).

Other CEA data suggest that the general decline in agriculture will turn around in 1988 but at the expense of farm jobs; farm employment is expected to decline from about 16,000 jobs in 1985 to around 14,000 in 1995. Military personnel levels, which increased from about 49,000 to almost 60,000 between 1979 and 1980, are expected to remain at that level through 1990.

Employment trends suggest that while the service economy expands, offering some skilled high tech and professional jobs, many new jobs will not require much skill. Problems with job satisfaction are implied, and some are calling for a rethinking of how jobs and work environments are structured and valued. (Appendix G contains a paper which addresses this matter and suggests implications for education.)

Another important point for speculation, especially for education, is the relationship between the aging of the baby boom population and future job opportunities for young adults. Competition for jobs can be expected for the next 15 to 20 years, when baby boomers begin to reach retirement age. (A few years later, some retired folks may be called back into the work force because the age cohort following the baby boomers is relatively small.) But what kinds of jobs will be in demand? Some, of course, will be mid- and upper-level management positions vacated by those who retire. But probably many will be jobs associated with life-activities and needs of the baby boomers themselves. There is enough lead-time to anticipate these and begin directing some educational emphases toward them.

EDUCATIONAL LEVELS AND PARTICIPATION PATTERNS

The decennial Census is the most comprehensive source of data on educational attributes of the total population, and on the relationship of education to other population characteristics (e.g., race, income, employment, etc.). During the early 1980's the CCHE co-sponsored two projects which analyzed census data for education planning implications [9]. The discussion which follows is based primarily on findings of those projects, and is supplemented by other data sources.

Schooling and Enrollment Levels

Statewide Data

Colorado's population shows high levels of educational attainment. As noted in Table 2, in 1980 about 80% of Coloradans age 25 and older had completed at least four years of high school--up from 64% in 1970. In contrast, only 66% of the U.S. population of the same ages had completed high school (up from 53% in 1970). Among all states, Colorado ranked first in the percent of the 25 and older population who were college graduates (23%). As was true nationwide, the numbers and proportion of Colorado adults with fewer than 12 years of schooling declined during the decade of the 1970's. Still, by 1980 over 350,000 Coloradans (age 25+) had not completed high school.

The decennial census provides school enrollment data for the population, age 3 and older. These self-reports of enrollment are categorized according to school level (i.e., nursery school, kindergarten, elementary, secondary, and college) and sector (public, and private--"church" or "other"). In 1980, to qualify as "enrolled", a person must have attended "regular school or college" sometime between February 1 and the time of the census (April 1). The Census Bureau defines "regular school or college" to include nursery school, kindergarten, elementary school or schooling which leads to a high school diploma or college degree.

Figure 11 displays 1980 census enrollment counts for Colorado, by two levels (nursery school through high school vs. postsecondary) and by sector (public vs. private). Over 800,000 Coloradans, age 3 and older, were enrolled in school in the spring of 1980 (29% of the 3 and older population). Of these, more than one-fifth (almost 180,000 people) were enrolled at the postsecondary level. Of those in postsecondary programs, 88% (almost 157,000) reported themselves as enrolled in public-sector programs and 12% (22,000+) in private-sector programs. In comparison, over 600,000 people were enrolled in nursery-though-secondary level programs. About 90% of these were enrolled in public institutions. Of the remaining 10% in private school programs, more than one-third were young children enrolled in private nursery schools (Appendix H provides additional details on census enrollment figures).

Census figures reflect fairly well the numbers of people in formal, diploma- and degree-oriented programs. However, at the postsecondary level, they tend to underestimate total numbers of people enrolled, and thus understate demands on educational institutions. For example, postsecondary figures would not include many of the students enrolled in non-degree, academic credit-granting and non-credit continuing education courses, nor many proprietary school students who do not view their enrollment as "working toward a college degree" [10].

Intrastate Comparisons

A recent report of CCHE's Population Dynamics Project documented regional differences in schooling and enrollment levels [11]. 1980 census data for Coloradans, age 19 and older, in metropolitan and non-metropolitan areas are

displayed in Table 3a-b; regions are defined on the map in Figure 12. (Data are for a 1% sample of Colorado's 1980 household population, so numbers can be multiplied by 100 to approximate population totals.)

As noted in Table 3a, people in metropolitan areas tend to have higher schooling levels than those in non-metro areas. Twenty-one percent (21%) of the metro population, age 19 and older, as compared with 17% non-metro, are college graduates. One-quarter of non-metro adults and one-fifth of metro adults have fewer than 12 years of schooling. Distinctions within sub-regions of metro and non-metro areas are more pronounced. Twenty percent (20%) of those in the West and Mountain regions are college graduates, compared with only 12% in East and South regions. The South has greatest proportions of adults with less than 12 years schooling (35%), followed by the East (29%) and Denver County (25%). When Denver County is excluded, the Denver-Boulder SMSA shows highest schooling levels, with 24% being college graduates and only 15% having fewer than 12 years of schooling.

Regional distinctions in enrollment are even more apparent (Table 3b). Statewide, 8% of Coloradans over age 18 were enrolled in school in the spring of 1980. Metro-area adults were more than twice as likely as non- metro people to be enrolled (9% metro vs. 4% non-metro). Highest proportions of enrolled were in "other SMSA's", which include Larimer, Weld, El Paso and Pueblo Counties.

Schooling Levels of Enrolled Adults

The larger report from which these data come (Appendix K) contain cross-tabulations of schooling levels and enrollment status. Cross-tabs show strong relationships between prior schooling and present enrollment status; people with higher levels of schooling are more likely to be enrolled. This is consistent with national studies which have shown that the propensity to participate in educational activity is best predicted by a person's past participation [12].

Relationships Between Education and Other Population Characteristics

The Population Dynamics Project study also documented population characteristics of people with higher vs. lower schooling levels, and those who were enrolled vs. not enrolled (Appendix K). To paraphrase study findings: people aged 30-39, males, Whites and Asians, those not disabled, those in skilled or professional occupations, those with higher incomes, and those who are native English-speakers have highest schooling levels. Recent in-migrants to Colorado were more likely than longer-term residents to have more schooling, as were non-rural and rural non-farm (vs. farm) people. In contrast, lowest schooling levels were observed among older adults, those of American Indian or Spanish origin, disabled adults, those not in the labor force or in minimum-skill occupations, those with lowest incomes, and those who are not native English-speakers.

People in non-rural areas were more likely than rural people to be enrolled in school, as were migrants (vs. longer-term residents), younger

adults, Asians (vs. other racial groups), single people (vs. married), adults without responsibility for dependent children, people in skilled and professional occupations, and people with higher levels of prior schooling. Blacks followed Asians in proportions enrolled. Whites, Hispanics and Native Americans were about equally as likely (as one another) to be enrolled. Those who speak another language at home (regardless of English- speaking ability) were about as likely as native English-speakers to be enrolled in school.

From a regional perspective, areas with greatest affluence, large numbers of young-to-mid age adults, fewest minorities, heaviest levels of in-migration and greatest concentration of postsecondary institutions tended also to have highest schooling and enrollment levels. Together, these data suggest that issues of access and equity of educational opportunity are yet to be resolved. Perhaps more striking are the strong relationships between education and the social and economic development within the state. If regional differences are to be moderated, widespread and concerted effort will be required--not only by education institutions and educators--but by many others as well.

ISSUES AND TRENDS IN POSTSECONDARY EDUCATION

Stemming largely from the demographic and socio-economic conditions discussed earlier in this assessment, a number of issues and trends are emerging in postsecondary education. Several which have special relevance to CCHE statewide planning efforts are noted below. The general questions and trends which are noted imply broad planning considerations and suggest a number of more specific issues. To the extent that issues are judged unduly divisive or trends undesirable, they imply need for planned intervention.

Effectiveness in Public Postsecondary Education

What constitutes effectiveness in the state's system of public postsecondary education is of central concern to the CCHE. The discussion which follows considers effectiveness issues in the context of statewide planning and policy considerations.

Equity Considerations

Colorado has been shown to reflect the complexities and pluralistic nature of U.S. society and to be unique in some regards. Demands of the post-industrial era, age shifts, growth in urban and minority populations, population turn-over, regional discrepancies in economic opportunity and disparities in educational attainment are especially evident in our state. In this context, we are reminded of the general issue introduced earlier, i.e., how can Colorado postsecondary education best serve interests of individuals and larger society in a way that promotes both social order and needed change?

Questions about how to provide postsecondary services in reasonably equitable fashion are not new. But demographic change, occupational shifts

and forecasts of a slowing economy suggest that several lingering equity issues are likely to become more pronounced. Rural access to education, urban vs. rural resource allocations, and relationships between community/economic development and postsecondary education are among those issues. Similarly, issues of service to people who have been under- represented in postsecondary programs are likely to become more pronounced. As their numbers grow, needs of such groups as ethnic minorities, older people, women entering the labor force, the under-employed, less affluent and under-educated people will stand in sharper contrast to the needs of those who have traditionally frequented postsecondary education.

Performance Expectations

As shown recently in the U.S., the ripple effects of lowered standards for high school and college graduation are far-reaching; the meaning and worth of diplomas and degrees are devalued, and as graduates become parents, teachers or other workers, their limitations affect performance expectations of children, employers and larger society. The ability to assure reasonable performance standards in the future is an urgent concern.

Some approaches to the problem are emerging in Colorado and elsewhere, where efforts are being made to improve elementary and secondary programs, to increase postsecondary-level entrance requirements, to raise undergraduate performance expectations, and to channel some students into remediation programs. But equity concerns and pressures to serve new students who may be ill-prepared for postsecondary participation suggest that more intensive and creative effort is needed. The availability of resources necessary for the effort is in question, not only because of postsecondary fiscal constraints and institutions' budget commitments, but also because FTE-based funding approaches require that more, not fewer, students be admitted if additional resources are to be forthcoming--which tends to complicate the problem.

There is another issue as well. Not long ago a high school education was adequate for most citizens. Today vocational certification or undergraduate degrees are expected by many, and graduate degrees are fairly common. Postsecondary education has come to be viewed as a right and in the process the authority of institutions and teachers to uphold standards has been undermined. This has happened because the reciprocal nature of rights and responsibility has been overlooked. When emphasis is placed on rights without commensurate attention given to the responsibility and obligations they carry, rights have no meaning. For example, if students have a right to a quality postsecondary education they must also be held responsible to perform to standards; if they do not and are allowed to graduate, degrees become meaningless. Likewise, if institutions and faculty members are obliged to provide quality postsecondary education, they must also have the right to enforce standards [13].

Levels and Types of Services

In recent years the labor force has been unable to absorb all who possess costly college degrees; because of this some are calling for significant cuts in postsecondary programs, especially those that emphasize advanced levels of

instruction. Unfortunately these calls are often over- generalized reactions to current circumstances, rather than being based in thoughtful anticipation of future conditions. If costly pitfalls of shortsightedness and over-generalization are to be avoided, issues having to do with levels and types of postsecondary service deserve careful attention. Several planning and policy considerations are highlighted below.

Occupational Needs. While detailed occupational forecasting in times of rapid change in a nation like ours is impractical, demographic and socio-economic trends provide some general and noteworthy considerations for education planners:

(1) If present retirement patterns hold, labor force competitiveness can be expected to decline when those on the leading edge of the baby boom begin to retire 20 years from now. Whether patterns hold will depend on such factors as the economic health of the nation and of programs like Social Security, financial circumstances of older people, and attitudes of the cohort toward retirement.

Whatever the case, some variation in job opportunity can be expected among employing organizations and some workers will undoubtedly be needed as direct replacements for those who do retire. But shifting economic emphases and forecasts for slowed growth also suggest that resources for other vacated positions will be redirected. While the service sector and information and advanced technology industries continue to expand, it is anticipated that relatively few new jobs will require high levels of knowledge or skill; others will require only minimal skill. As discussed earlier, these trends suggest increasing problems with worker satisfaction, the need to consider how jobs and work environments should be valued and structured in the future, and questions about the roles that postsecondary education might play in resolving these issues.

(2) Some areas of future employment and educational need will be more difficult to anticipate than others. To illustrate:

(A) Areas associated with high technology are especially volatile for several reasons: "break-throughs" which have potential to create new areas for employment and education (and perhaps to make others obsolete) are difficult to predict; for security, social and/or political reasons, timely information about technological capabilities and probabilities may not be forthcoming; advanced technology fields are often so highly mechanized and specialized that they require few skilled workers and can quickly become saturated.

(B) In contrast, other areas are somewhat easier to anticipate, and may offer opportunity for larger numbers of students and workers. For example, what types of occupations and educational experiences will be in demand over the next several decades because of the aging of the population? Possibilities include: those related to the health, housing,

leisure, work and learning needs of middle-aged and older Americans; those that promote community involvement, social unity and satisfactory levels of understanding among/between older and younger people.

(C) On another dimension and closest to home, occupational needs within education itself must be considered--not only because future society depends on those prepared by it--but also because postsecondary (and K-12) institutions are major employers in many places, especially for people with advanced degrees [14]. To anticipate future employment needs within the education sector, not only must educational needs in larger society be taken into account, but also those for education employees themselves. Considerations within education include: anticipated need for personnel in various positions, types of schools and geographic areas; internal demographics (e.g., age, length of service, turn-over rates of faculty in particular areas); potentials and incentives for shifting existing personnel to areas of greatest need, etc.

Needs for General and Recurrent Education. How well education in the present will serve Colorado and its citizens in the future is integral to discussions about effective service. Calls for a postsecondary core curriculum that emphasizes basic academic skills and the liberal arts address some concerns about the longevity of an education. These calls raise questions about the extent to which general education should be emphasized for students in various programs, at what levels, and in which institutions. Debate will no doubt continue about just what a core curriculum should entail, and whether it should be standardized across some or all institutions.

However widespread general education might become at the postsecondary level, advances in knowledge and job obsolescence also suggest needs for recurrent and continuing education. Questions associated with recurrent education of the state's citizens include: What are the educational expectations of older adults? What kinds and levels of educational services are most needed and how can they best be delivered? What role should the public (vs. private sector) play in providing them? Relative to initial educational preparation, what emphasis should recurrent education have? To what extent are older adults likely to participate? [15] Likewise, needs for recurrent education must be contemplated within education itself. Incentives and approaches for the updating and refreshing of education personnel merit special attention, particularly if one believes that education should provide leadership and models for the humane management of difficult social issues--issues like those of professional obsolescence.

Disciplinary and Interdisciplinary Approaches? The present period in education is often referred to as a time of "retrenchment". Brought on by serious budget limitations in an especially competitive and challenging time, retrenchment has generally meant defensive protection of "turf". From the perspective of academic content and organizational structure, this turf has historically been of a disciplinary nature. But a growing number of people see limitations of compartmentalized approaches to dealing with the topics and

problems of our times. Their views promote interdisciplinary approaches to instruction, research and service. While current organizational structures and funding tend to encourage disciplinary approaches, many argue that the future will require both--with greatest promise for new knowledge residing in creative synthesis of insights from a variety of vigorous disciplines [16].

For CCHE, this matter raises questions about what organizational structures should be encouraged in order to promote needed disciplinary and interdisciplinary work in the future. For example, should individual institutions maintain many of their disciplinary departments while adding interdisciplinary ones or should some institutions emphasize disciplinary work and others interdisciplinary? Should inter-organizational structures be encouraged (e.g., consortia arrangements or state-wide institutes for particular types of interdisciplinary or advanced disciplinary studies; collaborative agreements with private colleges or business and industry)?

Delivery Systems. Alternative ways to extend or enhance educational services are being experimented with today, both on- and off-campus. In particular, technology-based approaches offer potential for more efficient use of faculty time and widespread access to educational services through computer-assisted instruction, telecourses or information retrieval via remote computer terminals. There are several questions and issues associated with these approaches, especially: what types of technological infrastructure should be supported, and at what cost; the extent to which technological approaches should augment or supplant more personal approaches; whether sufficient numbers of learners are self-directed enough to benefit from less personal instruction; and generally, whether postsecondary effectiveness might suffer if too much emphasis is placed on the efficiency of educational technology.

While concerns about the effectiveness of instructional approaches are normally the prerogative of faculty members rather than policy makers, the availability of technologically-based delivery mechanisms cloud this distinction. For example, with the advent of personal computers and telecommunications, state and institutional policy has considerable potential to influence classroom instructional methods, frequency of student-teacher interaction, and class size. This being the case, policy decisions regarding use and funding of educational technology should take into account the advice of faculty members and educational researchers on such questions as: How well do students learn from various approaches? Do some types of students benefit more from one or another approach? Are some topics and levels of instruction more amenable to use of educational technology than others?

Because telecommunications technology is suitable for use beyond normal institutional boundaries, there are also inter-institutional and interstate considerations. From a state budget perspective, costs and duplication of service are of concern because of the relatively large investments required for telecommunications infrastructure and broadcast-quality programming. From an interstate perspective, quality concerns and competition for students raise issues that must be considered in the context of the pervasiveness of the media, consumer protection and interstate trade law. Because of such concerns as these, and consistent with its other coordinative and monitoring functions,

the CCHE Extended Studies Program has been given responsibility as agent for off-campus instructional telecommunications. In this role it convenes task forces, sponsors studies and makes recommendations on educational telecommunications and encourages collaboration and experimentation (e.g., joint-sponsorship of telecourses by several education institutions and public broadcast stations). A brief summary of the current status of educational telecommunications in Colorado is included in Appendix L; more detailed reports are on file at CCHE.

Needs for Long-Range Planning

The nature of education is such that considerable time is required to effect change. Consider, for instance, that many students take from five to seven years to complete a baccalaureate degree; graduate studies take more time, especially doctoral programs which are expected to prepare, among others, future college faculty members; new program approvals and accreditations often take more than a decade; capital investment approvals and construction can take longer. If education is to be relevant in the future, plans made in the present must be reasonably long-range and often must be implemented incrementally so that commitments to current students, faculty and institutions are honored. The need for visionary proactive planning is also implied; to follow the alternative model (where plans are developed in response/reaction to current circumstance) is to risk irrelevance even before plans can be operationalized.

Support for Public Postsecondary Education

Funding for Public Goods

A few years ago, costs and funding considerations were not particularly pressing agenda items for public postsecondary education. Colorado and the nation enjoyed economic prosperity and the resources needed to support a rapidly growing population were forthcoming. New schools and colleges were built, old ones were expanded. The federal government saw education as an important instrument in promoting social justice and advanced technology and a host of general and special purpose funds flowed to education institutions and directly to students in such forms as grants or loans. The private- sector contributed too, providing resources for specialized research, equipment, student aid and department-building. There was great demand for postsecondary education, not only because there had been unprecedented growth in the youthful population and because of equity considerations, but also because of the compelling fact that the nation needed more educated workers. With these as givens, and with state appropriations that grew each year because they were based on numbers of students served, postsecondary education flourished.

Circumstances are very different now and postsecondary agendas reflect preoccupations with matters of finance, cost-containment, efficiency and fiscal accountability. Having expanded in size and substance to meet previous demands, the present effects of age shifts, stiff competition in the labor force, federal and private-sector cutbacks and state budget limitations

present serious challenges for postsecondary education. To meet the challenges, public education planning and policy must be considered in light of resource availability and the public good.

By definition, public goods are things—accomplishments of society— that are so important to its functioning that we collectively pursue and pay for them. In our nation peace, security, good health, and an educated citizenry are central public goods (in contrast to private goods which are individually possessed for the benefit of the individual holder). To achieve them, we have such public services as those associated with the military, law enforcement, old age pensions, protection from epidemics, safe food, clean air and water, and education. Unlike private commodities, public goods are not priced by the marketplace; expenditures for public goods are determined by public need and through such collective processes as public opinion, voting and legislative decision. As societal imperatives, public goods investments anticipate needs and prevent future problems (e.g., we have armed forces to prevent the likelihood of a war and to be prepared if others attack us; we have public health regulations to prevent widespread illness; we provide education to assure that we have a qualified workforce and the leadership needed for the future, including the leadership of other public organizations). This being the case, the financing of particular public services must be considered in the context of their relative importance to a population and in terms of what the long- range costs of not providing them would be [17].

Thus, issues of cost and funding for particular public postsecondary services must be considered in terms as such questions as: In what ways do/would they serve the public good? What would be the consequences if they are not provided in the public sector? Some sample considerations for CCHE include:

- In what ways do specialized, technical program offerings support the public good? ...Compared to liberal arts programs? What would be the consequences if one or the other was not provided or was de-emphasized?

- In what ways do particular types of postsecondary institutions serve the public good (i.e., small and large colleges, rural and urban institutions, vocational, 2-year, 4-year and graduate institutions)? If some did not exist, or were significantly altered in form or purpose, what would be the likely consequences for the state's ability to manage its challenges?

- With regard to honoring public values of equity and access, what are the probable effects of limiting the availability of student aid? What are the implications of providing aid based on financial need rather than scholastic ability?

Public Willingness to Invest in Education

Over the years, citizens have come to expect many public services—and with the aging of the population it is likely that there will be increased demand for some, especially such services as those related to health,

retirement pensions and public safety. In the context of competing demands, the willingness of the public to support investments for a particular service has mostly to do with their confidence in and valuing of that service. How well public postsecondary education will fare in the future will largely depend on public perceptions of its worth. Unfortunately, there are two important forces at work which are likely to affect public opinion in negative ways--unless action is taken to overcome them.

First, expectations that higher education will assure individuals of a good job, more money and higher social status are increasingly unrealistic, causing people to question its worth. Here we suffer from our own rhetoric: educators have long used these sorts of "private-good" arguments to proclaim the merits of a public postsecondary education. And, having trained more people than the labor force can absorb and granted some degrees of questionable quality, we are now caught in the trap of promising what we can no longer deliver.

To overcome this problem, we are challenged to develop sound, believable rationale--compelling reasons why the public should support postsecondary education. Rationale that stress personal gain are no longer sufficient; more emphasis must be placed on the public good and how, together, people stand to benefit from a statewide system of postsecondary education. At the same time, postsecondary performance standards must be high enough and service equitable enough to assure public confidence and credibility.

Second, when people's involvement with public institutions declines, their support is less likely. As the baby boomers age, there will be fewer adults with interests vested in schools and colleges that typically serve youth. As well, circumstances of the times have encouraged bureaucratic and technocratic management of public problems and public services. These approaches fulfill some important functions, but they also increase the "distance" between citizens and their public institutions. If public support is to be forthcoming, current practices and contemplated actions must be evaluated with such factors in mind. For example:

- Applied research, community service and outreach functions of postsecondary education are generally among the first to suffer when budgets are cut. In the long-run, how might such actions influence support for education?

- To the extent that impersonal technology replaces face-to-face interaction between students and educators, how might this affect public support?

- In what ways might program consolidations or institutional mergers affect public support?

Support from Within Education

As long as education is managed in such a way that institutions must compete with one another for attention, status and operational funds, we are treating the provision of public education as though it were a private

commodity. Today the adversarial model applies, with "the system" tolerating fierce competition not only between postsecondary institutions and among academic departments, but also between "K-12 interests" and those of higher education. This being the case, institutions can be expected to react to proposed changes in ways that protect their own, not necessarily the public's, interests.

The present model has serious shortcomings--and in the U.S. there is little precedent for other approaches. We are challenged to thoughtfully experiment with other approaches, building them on the foundation of what many within and outside education would agree to: a statewide system of public education should promote the welfare of students and society by encouraging cooperation and coordination among institutions so that they can provide educational services which are for the good of all and of such relevance and quality that the public is willing to support them. In the previous environment of growth and prosperity the need for cooperation and coordination among institutions was less apparent; today the need is more obvious but the issue is whether there is the will to exert concerted effort. To be sure, cooperation requires much effort and often costs individual and institutional autonomy. Yet cooperation is imperative in the acquisition of public goods for, by definition, they can only be achieved through collective action.

Finally, issues of productivity and the attitudes and morale of educators need to be considered. Ideological debates coupled with public skepticism, program reorganization, budget cut-backs and very realistic concerns about job security not only make faculty and staff uncomfortable and suspicious, they stifle creativity and divert attention from the tasks of educating.

Early in this report it was asserted that the post-industrial era and the coming age of information and high technology "demand and are dependent on the major forte of education--i.e., the development and nurturance of human capital" (p. 3). In the last Colorado postsecondary education master plan, faculty--i.e., the human resources and capital of education--were identified first on the list of "what we value". This being the case, circumstances and actions which affect morale are essential considerations in the planning process.

ENDNOTES

[1] Much has been written about the present and coming age. For somewhat different examinations, see Daniel Bell, The Coming of the Post-Industrial Society (NY: Basic Books, 1973); Alvin Toffler, The Third Wave (NY: Bantom, 1981); John Naisbitt, Megatrends (NY: Warner, 1982); and Paul Hawken, et. al., Seven Tomorrows (NY: Bantom, 1982). Extensive data-based documentation of U.S. social conditions and trends (with international comparisons) is available in Social Indicators III (Bureau of the Census, December, 1980).

[2] Classic discussions of societal maintenance and societal change appear in Arnold J. Toynbee, A Study of History (10 vols., NY: Oxford University Press, 1934-54); Wilbert E. Moore, Social Change (Englewood Cliffs, NJ: Prentice-Hall, 1963); and Richard P. Appelbaum, Theories of Social Change (Chicago: Rand McNally College Publishing Co., 1970). The cultural continuity/stability and change-oriented themes of U.S. education are evident in Van Cleve Morris, Philosophy and the American School (Boston: Houghton Mifflin, 1961, pp. 11-14); the historical predominance of one vs. the other are discussed in Part V of the same text.

[3] Several of David Riesman's books on society and the individual are relevant, including: The Lonely Crowd (with Glazer and Denney, Garden City, NY: Doubleday, 1953), Individualism Reconsidered (Garden City, NY: Doubleday, 1954), Constraint and Variety in American Education (Lincoln: University of Nebraska, 1958), The Academic Revolution (with Jencks, Garden City, NY: Doubleday, 1968), and The Perpetual Dream: Reform and Experiment in American Colleges (with Grant, Chicago: University of Chicago Press, 1976). Also, see John W. Gardner, Excellence (NY: Harper & Row, 1961). A classic source on the relationship between society and the individual is Pitirim Sorokin, Social and Cultural Dynamics (4 vols., NY: American Book Co., 1937- 41).

[4] Dilemmas and options of post-industrial times, with several implications for education, are concisely discussed in Warren G. Bennis and Philip E. Slater, The Temporary Society (NY: Harper & Row, 1968). A number of education sources recognize complexities of the new age and offer potential options. Several sources which address curriculum concerns include: Harold G. Shane (with M.B. Tabler), Educating for a New Millenium (Bloomington, IN: Phi Delta Kappa Educational Foundation, 1981); Ernest L. Boyer and Martin Kaplan, Educating for Survival (Change Magazine Press, 1977); David G. Winter, et. al., A New Case for the Liberal Arts (San Francisco: Jossey-Bass, 1981). General responsibilities of higher education are noted in: Derek Bok, Beyond the Ivory Tower (Cambridge, MA: Harvard University Press, 1982) and Howard R. Bowen, The State of the Nation and the Agenda for Higher Education (San Francisco: Jossey-Bass, 1982). A critical analysis of education's ability to promote social and economic equality is provided in Murray Milner, Jr., The Illusion of Equality (San Francisco: Jossey-Bass, 1972). In addition, and of special relevance to CCHE's statewide

planning and policy responsibilities, are: Robert Birnbaum, Maintaining Diversity in Higher Education (San Francisco: Jossey-Bass, 1983) and John D. Millett, Conflict in Higher Education (San Francisco: Jossey-Bass, 1984). (The first is concerned with maintaining educational diversity in the face of "homogenizing" forces which are making different postsecondary institutions become more alike; the second discusses conflicts which occur because of differences in orientation of postsecondary institutions and agencies responsible for statewide coordination of postsecondary education.)

[5] The source of population estimates and projections data is the Demographic Section, Colorado Division of Local Government (i.e., "State Demographer"), "Colorado Population Projections" data run of October, 1986. The base year for intercensal population estimates (1981-'85) and for projections is 1980 (Census). The estimates and projections were provided by the State Demographer for information purposes only--they have not been adopted as "official" projections by the CO Division of Local Government.

Components of population change include natural increase (births - deaths) and net migration. County-by-county variations in fertility and migration rates are considered in the projections. Because of the recent slowing of in-migration, a 25-year annual average for each county unit--except for counties in the Denver CMSA--is used as a constant in calculating population size for future years (i.e., it is assumed that future net migration for each county outside the Denver CMSA will be the same as its annual average net migration from 1960 to 1985).

In providing the projections, the State Demographer notes (1) that actual population change will likely differ from projections, with the principal source of forecast error being discrepancies between assumptions used in the statistical model and actual values of major components of change (e.g., higher or lower migration rates, fertility rates, etc.) and (2) that, generally, projections for the longer-range future and for geographic areas with more volatile population trends will be less accurate than projections for the nearer future and for larger areas with stable population trends.

[6] There are several factors to consider when speculating about the extent of baby boomers' future participation in postsecondary educational programs. National and state studies of adult participation have shown that even though there are a number of people beyond traditional college age (e.g., 18-24 years) who are enrolled in college (particularly in community colleges), participation rates decline considerably as age increases (especially around age 35). Adults with highest participation rates tend to be those of higher socio-economic status or those who are considered "upwardly mobile". Adults from urban areas tend to have somewhat higher participation rates than those from rural areas. The strongest predictor of an adult's future participation in learning activity is the extent to which he/she participated in the past--especially in formal school programs (i.e., the more years of formal education a person has, the more likely he is to participate in

some form of learning activity in the future). Other fairly strong predictors of an individual's participation have to do with "life transitions" that adults must face, which "trigger" learning activity (e.g., changes in job or career, family changes such as divorce or children leaving home, health changes, retirement, etc.). U.S. and Canadian studies have shown that while the majority of adults participate in "self-directed" learning activity, fewer (about one- third) participate in "organized instruction", and even fewer (about 10%) participate in formal education programs for credit or credentials. It is also known that adults are typically part-time learners/students.

As elsewhere, Colorado baby boomers have moved beyond "traditional" college age, and many will soon be beyond the age of the typical "non-traditional/older-than-average" student. And while, nation-wide, baby boomers generally have higher levels of education than the previous generation, Colorado baby boomers possess particularly high levels of education and fairly skilled or professional occupations. (This is largely due to the influence of in-migration during the 1970's and early '80's, and is discussed in a later section of this report.)

Thus we can speculate that on the one hand, because of their age, baby boomers will be less likely to participate in postsecondary programs in the future; on the other hand, because of their past education (and perhaps their needs for continuing professional education), they may be more likely to participate at older ages than was true of the earlier generation. The latter possibility is the more shakey of the two propositions--especially for postsecondary institutions which are concerned primarily with degree-oriented educational programs. One could hypothesize, for example, that since so many Colorado baby boomers already possess advanced degrees (and know first-hand of the personal effort and financial costs of having achieved high levels of education), relatively few will pursue additional degrees. Periodic participation in selected academic credit courses may be more likely, as might be participation in intensive credit or non-credit short- courses, skill certification courses, etc.

A number of sources document adult participation rates and patterns, among them: K. Patricia Cross, Adults As Learners (San Francisco: Jossey-Bass, 1981); Carol B. Aslanian and Henry M. Brickell, Americans in Transition: Life Changes As Reasons for Adult Learning (NY: College Entrance Examination Board, 1980); Allen Tough, The Adult's Learning Projects (Toronto: The Ontario Institute for Studies in Education, Research in Education Series No. 1, 1979); Sheila A. Knop, "A Profile of Colorado's Adult Learning Needs and Resources" (Denver: Colorado Lifelong Learning Project, Colorado Commission on Higher Education, September, 1983).

[7] "Local Implications of Net and Turnover Migration", E. Knop and T. Bacagalupi, PACE, Vol. 2, No. 1 (Winter 1985), Denver: CCHE, pp. 9-11.

[8] Gary Hunt of the Center for Economic Analysis (CEA), University of Colorado-Boulder, presented CEA forecasts at the Fall Meeting of the

Colorado Extended Studies' Deans and Directors. He noted that the forecasts are based on current policy in the U.S. and Colorado. They assume that oil prices will rise to about $20-$25/barrel by 1990 but won't go much higher, that increased inflation will result, and that the Fed will then intervene to control inflation (thus the leveling/slowing of the economy between 1991-'95). The forecasts also assume that the spirit of Graham-Rudman will continue to have influence, and will moderate defense spending, etc. Other factors which could intervene, such as international events of major economic consequence, are not considered in the forecasts, nor are such policy changes as new economic development strategies and initiatives— especially at state and local levels. Similarly, such matters as how states will deal with the effects of the new federal tax law are not considered in current forecasts.

[9] The Colorado Lifelong Learning Project (1980-1983) was co-sponsored by the CCHE, the Education Commission of the States, the W.K. Kellogg Foundation and the Divisions of Continuing Education of CSU and UC-B. The Population Dynamics Project (1983-1986) was co-sponsored by CCHE and the U.S. Fund for the Improvement of Postsecondary Education.

[10] CCHE reports on the Colorado Extended Studies program for 1979-80 show about 55,000 credit course "enrollments", which produced over 150,000 student credit hours (Appendix I). While not directly comparable because they report "enrollments" (vs. "headcount") and are for an entire year (vs. spring), if one assumes continuing education students might possibly enroll in as many as four or five courses during a year, then the numbers enrolled in public postsecondary institutions would increase by about 10,000. This is probably a conservative speculation, given the part-time nature of continuing education. Also, non-credit enrollments are not considered in the decennial census. (In 1979-80, Extended Studies reports about 30,000 non-credit "enrollments", representing almost 36,000 student credit hours.)

Private-sector participation rates are somewhat more difficult to estimate. Non-degree continuing education students enrolled in private colleges and the University of Denver are probably under-represented in decennial census counts, as are students in proprietary schools who do not view their enrollment as "working toward a college degree". Recent State Board of Community College and Occupational Education enrollment reports for proprietary schools are included in Appendix J.

Also see Endnote [6] for additional information about adult participation in learning activity and educational programs.

[11] "Demographic Insights for Education Planners: Selected Analysis of Census Data on the Colorado Population", S. Knop and R. Nelsen, Population Dynamics Project, CCHE, August, 1985.

[12] K. Patricia Cross, Adults As Learners (San Francisco: Jossey-Bass, 1981, pp. 53-55).

[13] For a discussion of the reciprocal nature of rights and responsibilities see Lenora Bohren, Edward Knop and Sheila Knop, "Defining Rights and Responsibilities: An Energy Development Case," High Plains Applied Anthropologist, Vol. 5, No. 3, Summer/Fall, 1985, pp. 7-13.

[14] In the fall of 1985, Colorado's public K-12 and postsecondary districts and institutions directly employed about 75,000 workers, representing 29% of all government workers and 4.7% of all non-agricultural wage and salary workers in the state. Of these, almost 43,000 were professional personnel, with 23% employed by postsecondary institutions (as administrators, faculty members or non-faculty professionals) and 77% as teachers or administrators in K-12 schools. The vast majority of postsecondary professionals possess advanced degrees, while about half of those in public schools hold graduate credentials. Besides public K-12 and higher education professionals, there are others, of course, including those in state, regional and local education agencies, private schools and colleges, etc. For additional details on current employment in Colorado education, see: "Status of K-12 Public Education in Colorado" (Colorado Department of Education, 1986); "Status of Minorities in Colorado Public Higher Education, Fiscal Year 1985-'86" (Colorado Commission on Higher Education); and Colorado Labor Force Review (Colorado Department of Labor and Employment, Vol. 23, No. 11, Nov., 1986).

[15] Some insights on these questions are provided in sources cited in endnote 6 of this report.

[16] These topics and issues are discussed in "Making the Mixed-Discipline Farming System Model Work: Issues and Management Insights from U.S. and Egyptian Projects," Ed Knop, Maya ter Kuile, Willard Schmehl and Mary Beebe in Farming Systems Research and Extension: Management and Methodology, Cornelia Butler Flora and Martha Tomecek (eds.), Manhattan, KS: Kansas State University Farming Systems Research Paper Series, August, 1986.

[17] For a discussion of public goods and social policy, see Martin Rein, From Policy to Practice (Armonk, NY: M.E. Sharp, Inc., 1983); for discussions of public goods, rational and collective action see Mary Douglas, How Institutions Think (Syracuse, NY: Syracuse University Press, 1986); for a summary of dilemmas imbedded in American higher education that are related to the acquisition of public good see Paul L. Dressel, Administrative Leadership, Chp. 2, "Morals, Ethics, and Values in Higher Education" (San Francisco: Jossey-Bass, 1981).

Figure 1. The Planning and Policy Formulation Process

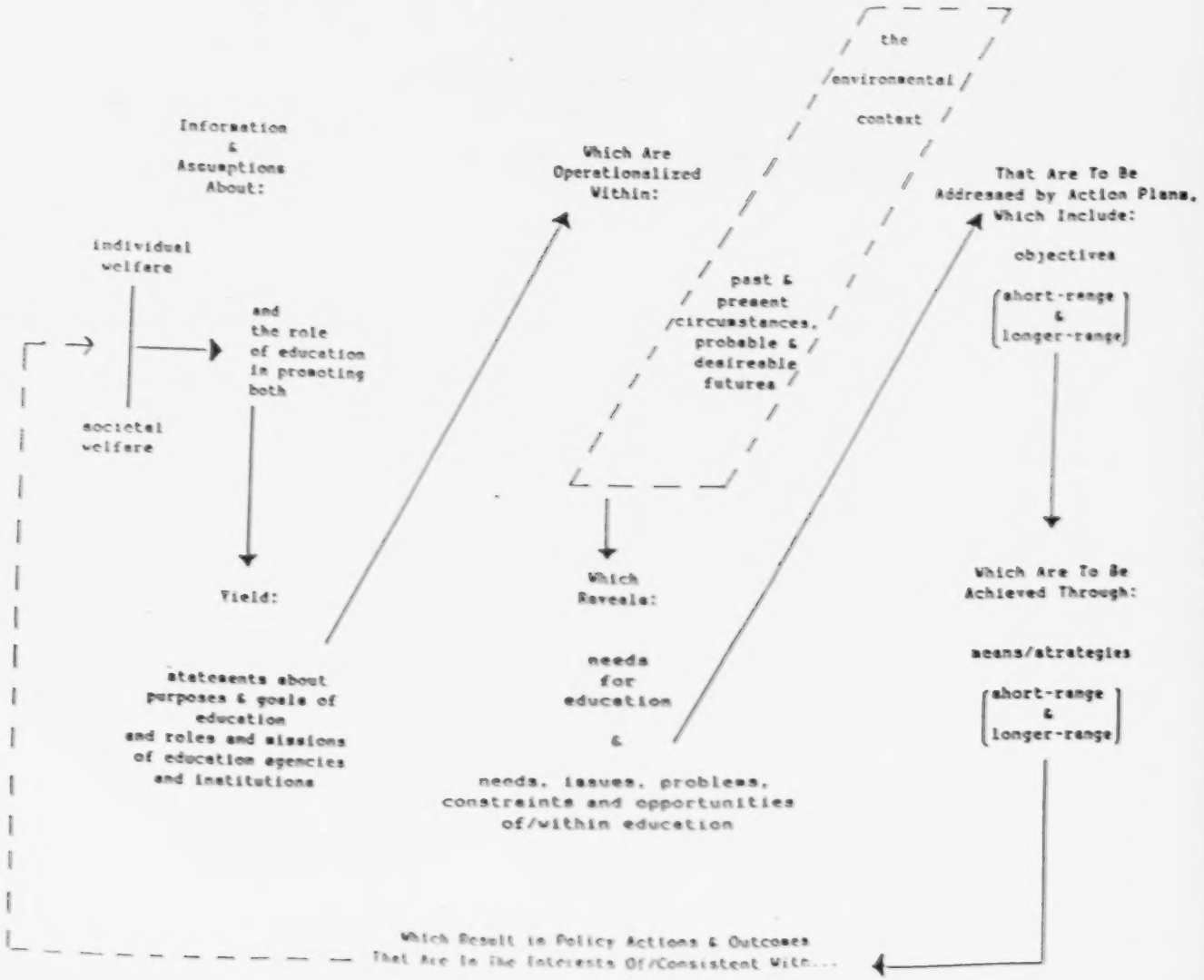
Information & Assumptions About:
individual welfare
societal welfare
and the role of education in promoting both
Yield:
statements about purposes & goals of education and roles and missions of education agencies and institutions
Which Are Operationalized Within:
the environmental context
past & present circumstances, probable & desireable futures
Which Reveals:
needs for education &
needs, issues, problems, constraints and opportunities of/within education
That Are To Be Addressed by Action Plans, Which Include:
objectives
(short-range & longer-range)
Which Are To Be Achieved Through:
means/strategies
(short-range & longer-range)
Which Result in Policy Actions & Outcomes That Are In the Interests Of/Consistent With...

figure prepared by s. knop, 10/86

Figure 2. The Public Postsecondary Education Environment

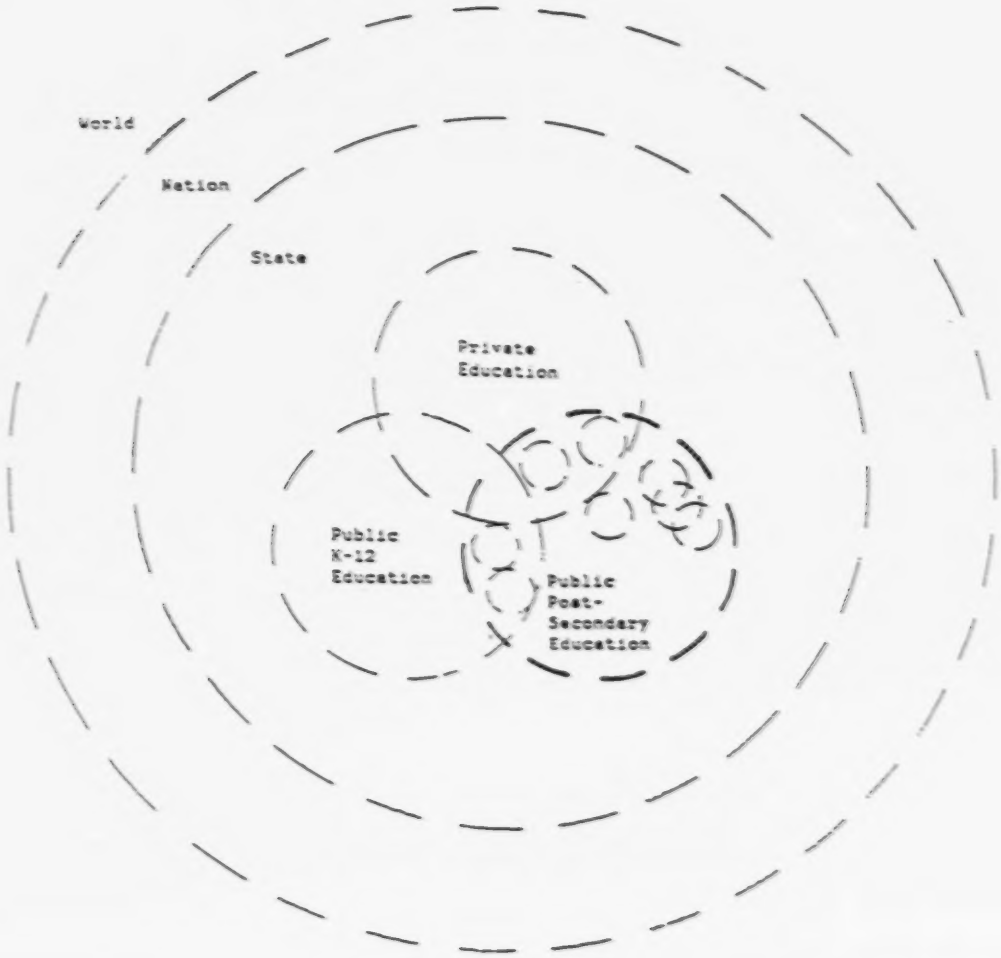

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Figure 3. The Focus of the Environmental Assessment

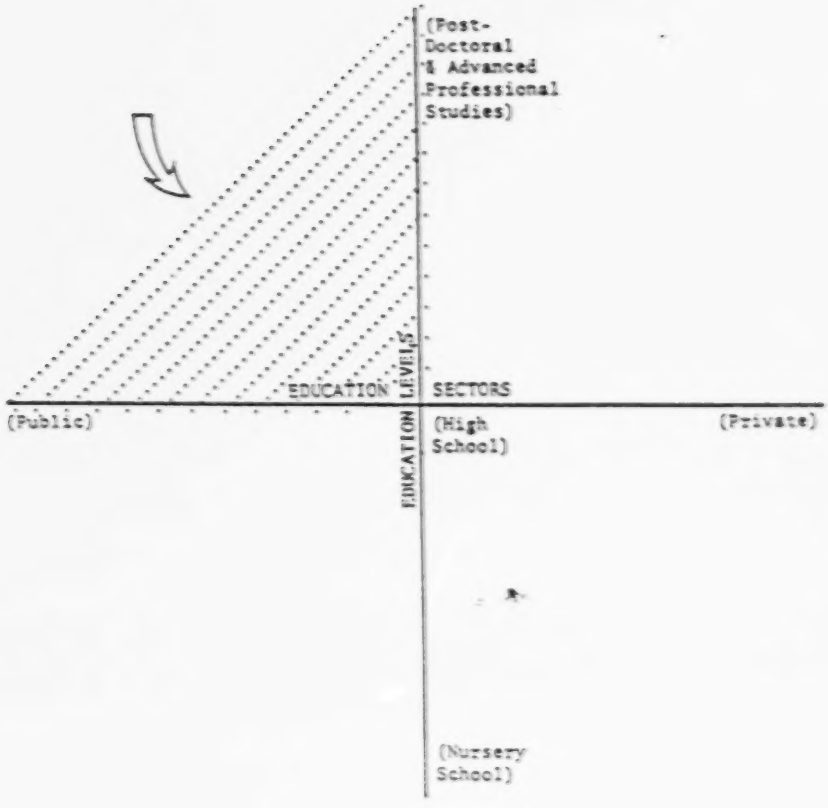
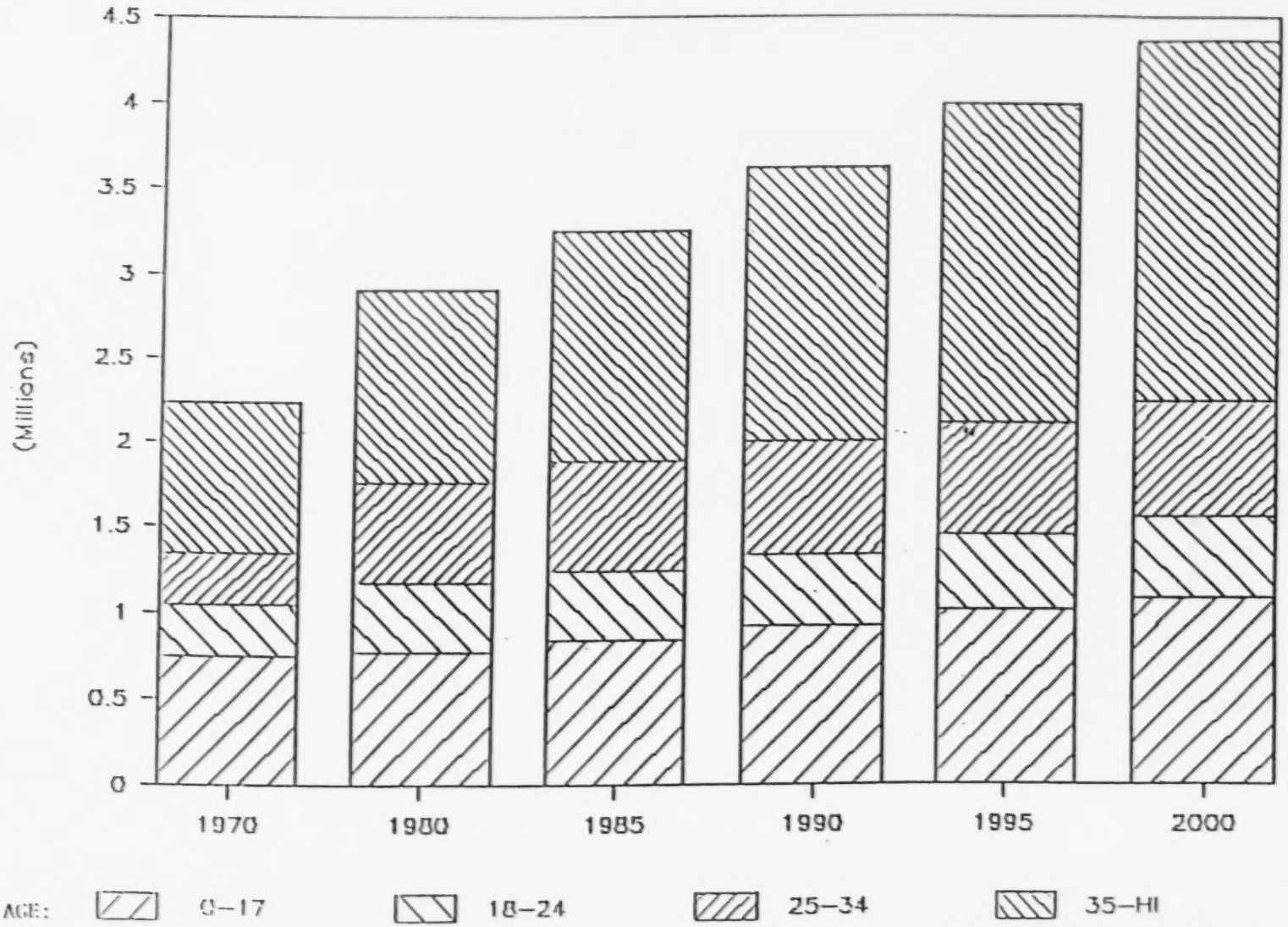


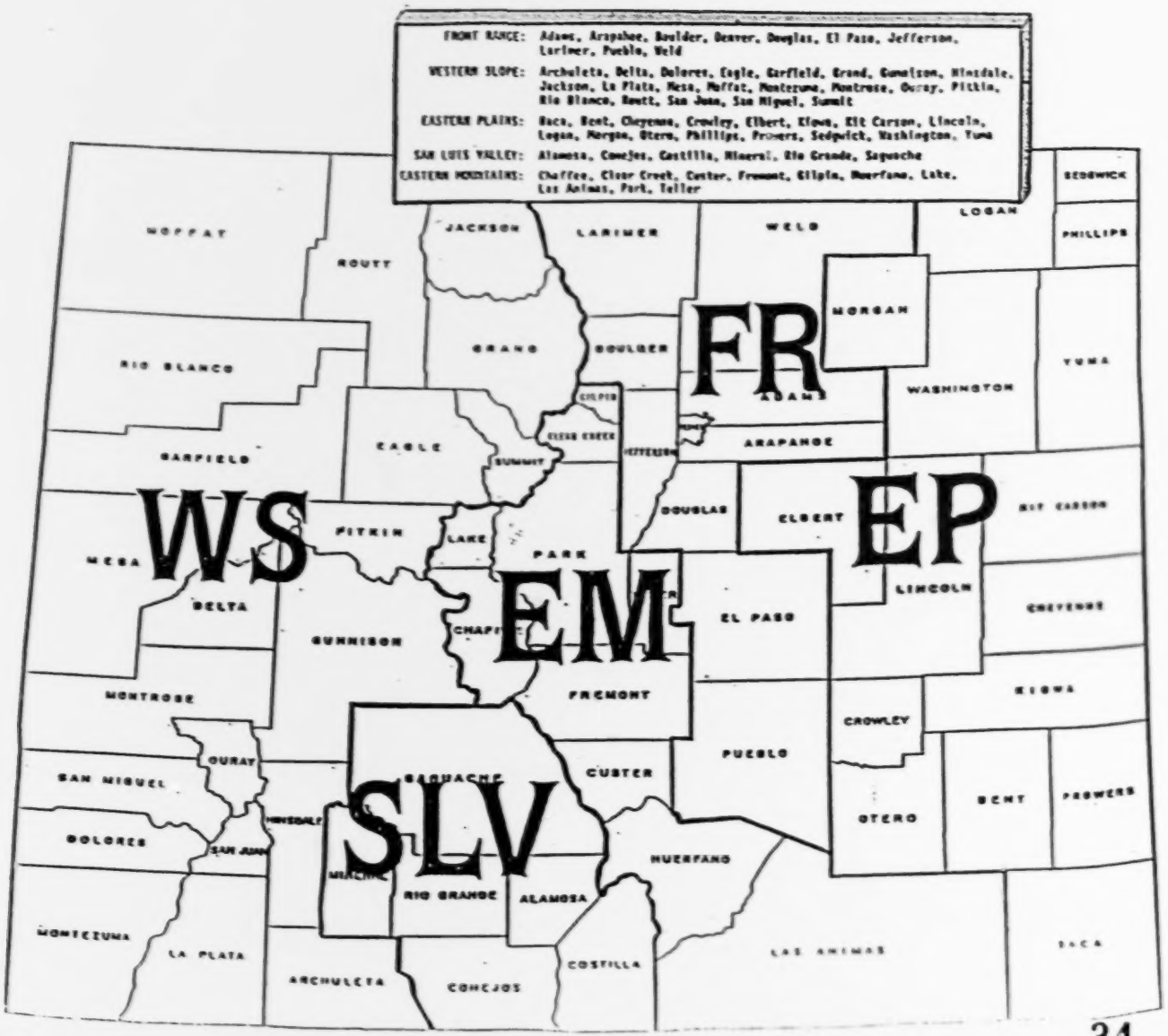
figure prepared by s. knop, 10/86

Figure 4. Colorado Population Growth, 1970 - 2000
(by four age categories)



Source: Age-specific population estimates and projections data tape provided to CCHE by the Demographic Section, Colorado Division of Local Government, Fall, 1986.
Chart prepared by CCHE Office of Information Management and Research.

Figure 5:
Colorado as Five Regions[1]



[1] The five regions are those frequently used by the Demographic Section, Colorado Division of Local Government.

Figure 6a
Population Growth by Colorado Region, 1930 - 1980

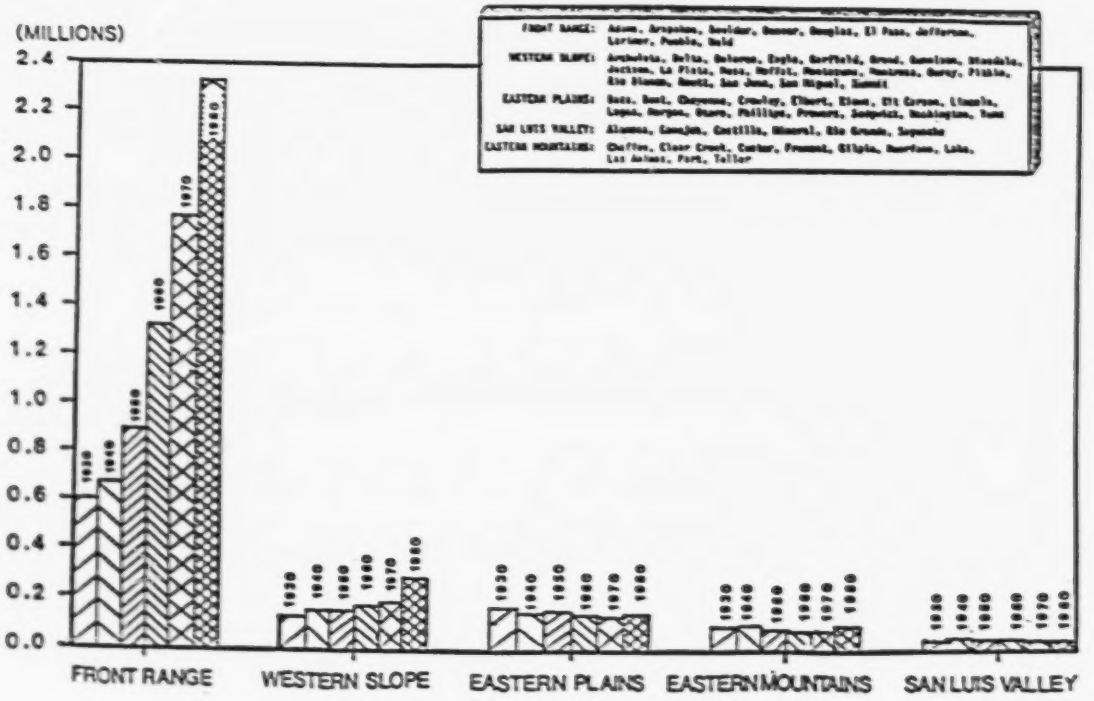
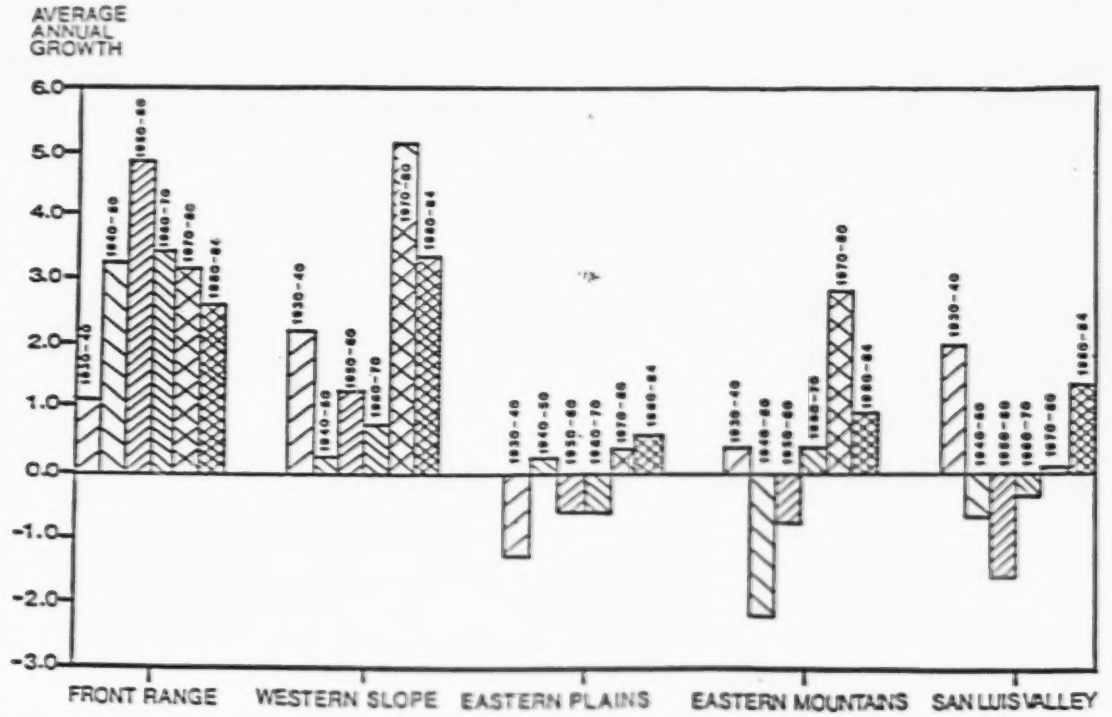


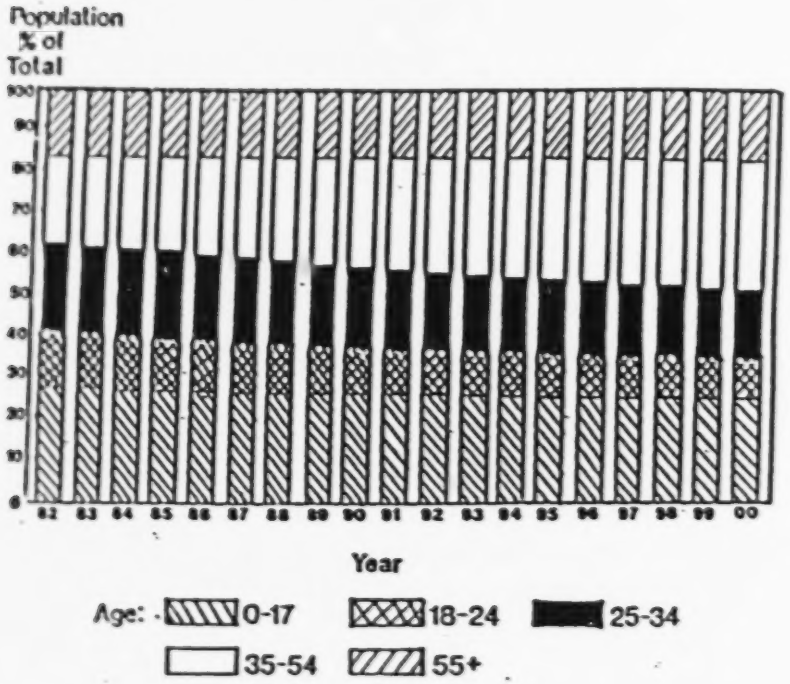
Figure 6b
Average Annual Growth by Colorado Regions, 1930 - 1984



Source: U.S. Bureau of the Census, charts prepared by CO Division of Local Government and originally appeared in an article authored by Reid Reynolds (State Demographer) for PACE (Vol. 2, No. 2, Spring, 1985).

Figure 7

Proportional Representation of Age Cohorts,
Projected for Colorado, 1982 - 2000

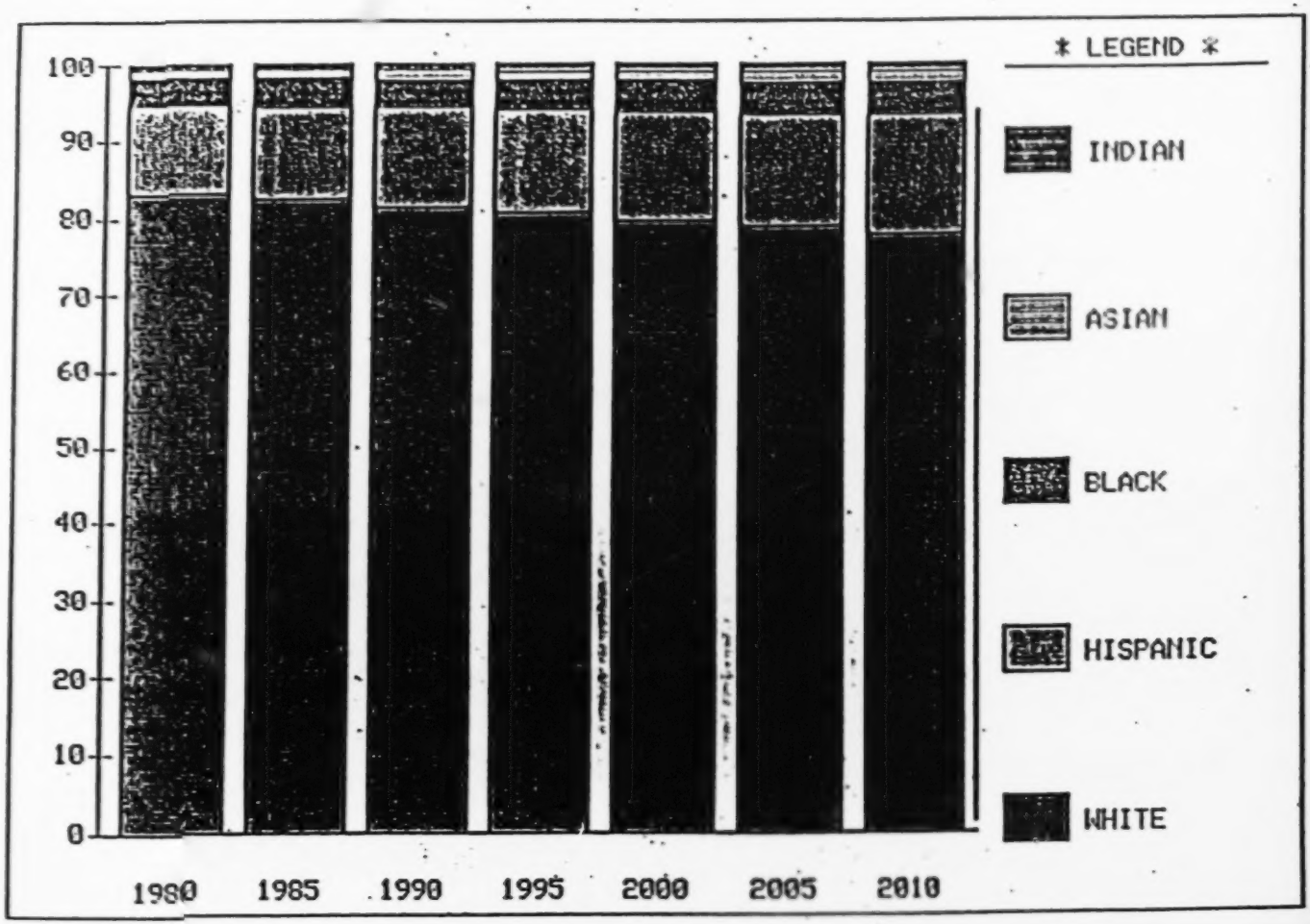


Source: Demographic Section, CO Division of Local Government, chart originally appeared in an article prepared by William Mowder, CO Office of Planning & Budgeting for PACE (Vol. 2, No. 2, Spring, 1985). Projections are based on 1982 population estimates.

Note: in a graph as this, effects of more recent slowing of migration (which tends to be age-specific) would be slight, with proportions of 18-24 and 25-34 age categories perhaps a bit smaller [sk]

Figure 8.

PROJECTED SHARE OF TOTAL POPULATION, COLORADO ETHNIC GROUPS, 1980 - 2010

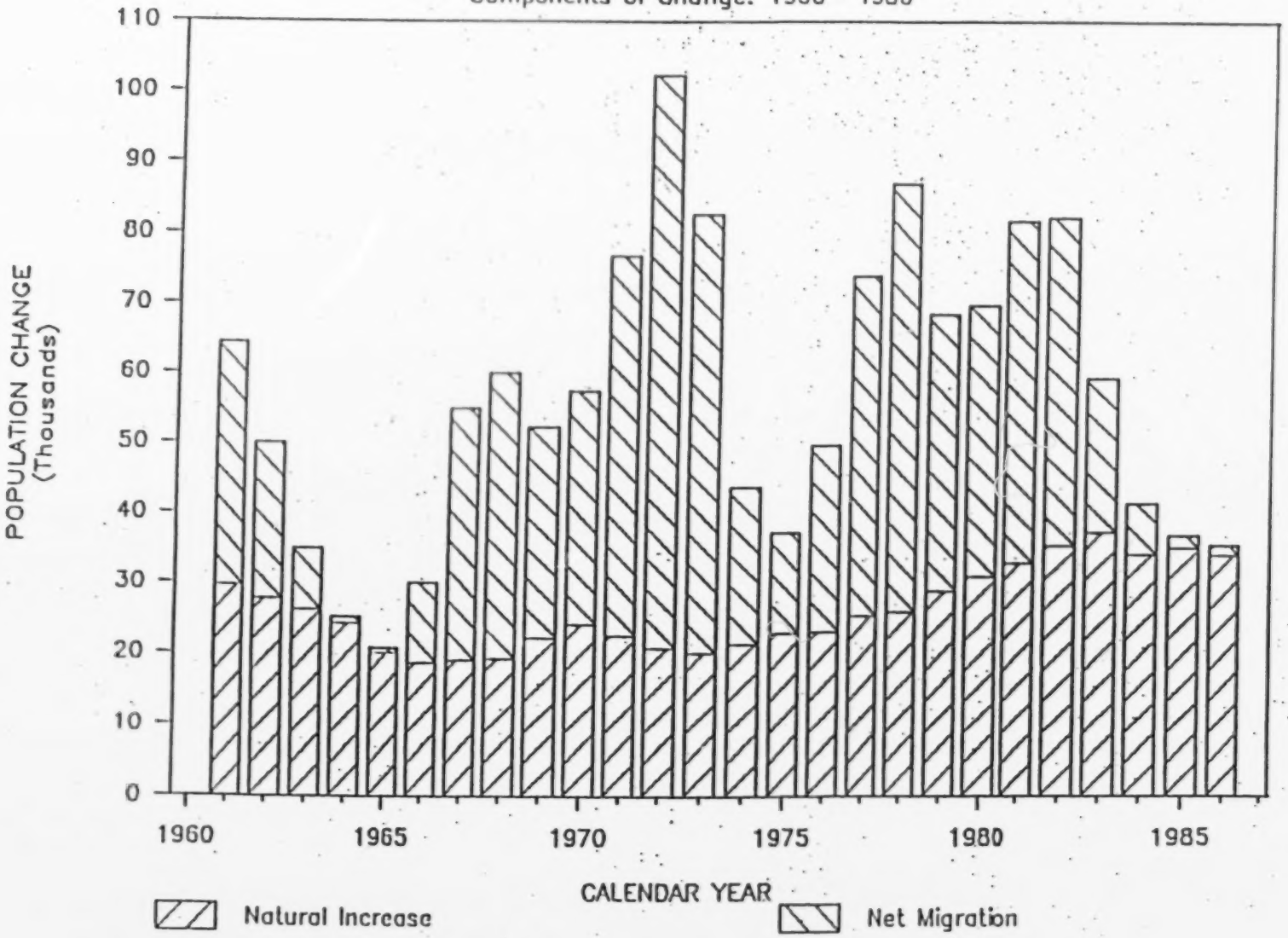


Source: Demographic Section, Colorado Division of Local Government; Ethnic Projections 11/86

Figure 9

COLORADO POPULATION CHANGE

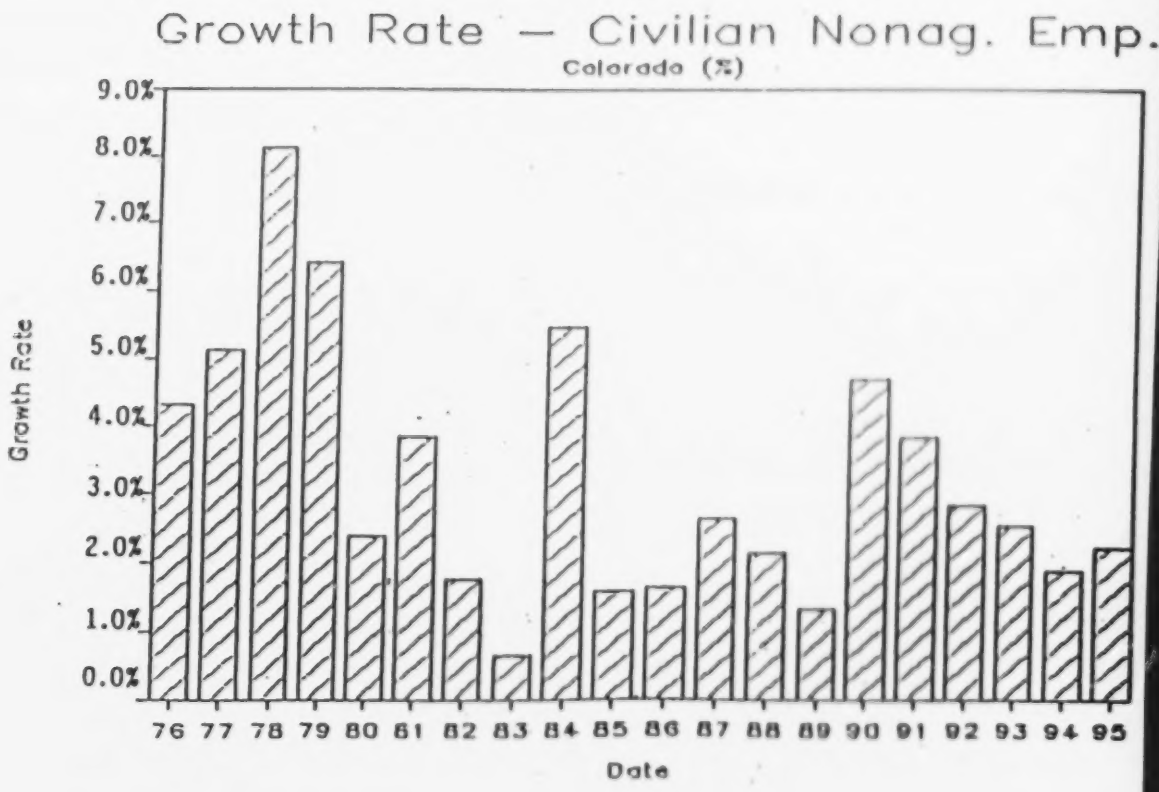
Components of Change: 1960– 1986



Sources: U.S. Census Bureau, Colorado Dept. of Health, and Colorado Div. of Local Government

Prepared by Colorado Division of Local Government (11-07-86) YRI

Figure 10



Source: Center for Economic Analysis, University of Colorado-Boulder

Table 1a

OCCUPATIONAL DISTRIBUTION OF COLORADO CIVILIAN NONAGRICULTURAL EMPLOYMENT: 1975, 1985, 1995

Occupational Category	1975 Number (000's)	1975 % of Total	1985 Number (000's)	1985 % of Total	1995 Number (000's)	1995 % of Total
Engineers	12.2	1.2	19.4	1.3	24.8	1.3
Computer Specialists	5.1	0.5	8.3	0.6	11.3	0.6
Health Professionals	20.3	2.1	28.9	2.0	40.5	2.2
Engineering and Science Technicians	10.1	1.0	16.0	1.1	20.8	1.1
Teachers (except college)	6.3	0.6	8.6	0.6	11.1	0.6
Writers, Artists, and Entertainers	13.6	1.4	22.8	1.6	32.5	1.7
Religious, Social and Teaching Professionals	18.0	1.8	24.3	1.7	29.6	1.6
Professional, Technical, and Kindred (n.e.c.)	45.2	4.6	67.5	4.6	91.7	4.9
Managers and Administrators	117.5	11.9	176.2	12.1	231.4	12.4
Sales Workers	62.8	6.4	95.5	6.6	128.0	6.8
Clerical and Kindred Workers	207.6	21.2	305.0	21.0	398.7	21.4
Construction Crafts	45.4	4.6	69.9	4.8	86.4	4.6
Crafts and Kindred (except construction)	74.2	7.5	108.6	7.5	131.0	7.0
Operatives (except transport)	81.1	8.2	116.5	8.0	134.0	7.2
Transport Equipment Operatives	34.8	3.5	48.0	3.3	57.0	3.0
Laborers	48.5	4.9	69.4	4.8	84.6	4.5
Cleaning, Food, Personal, and Protective Service Workers	182.7	18.6	267.0	18.4	355.9	19.1
TOTAL	985.4	100%	1451.9	100%	1869.3	100%

Source: Center for Economic Analysis, University of Colorado at Boulder, Colorado History Data Files and Colorado Control Forecast (October, 1986)

Table 1b

CHANGE IN COLORADO CIVILIAN NONAGRICULTURAL EMPLOYMENT BY OCCUPATION: 1975-85 and 1985-1995

Occupational Category	Change in Employment (000's) 1975-1985	1985-1995	Difference 85-95/75-85
Engineers	7.2	5.4	-1.8
Computer Specialists	3.2	3.0	-0.2
Health Professionals	8.6	11.6	+3.0
Engineering and Science Technicians	5.9	4.8	-1.1
Teachers (except college)	2.3	2.5	+0.2
Writers, Artists, and Entertainers	9.2	9.7	+0.5
Religious, Social and Teaching Professionals	6.3	5.3	-1.0
Professional, Technical, and Kindred (n.e.c.)	22.3	24.2	+1.9
Managers and Administrators	58.7	55.2	-3.5
Sales Workers	32.7	32.5	-0.2
Clerical and Kindred Workers	97.4	93.7	-3.7
Construction Crafts	24.5	16.5	-8.0
Crafts and Kindred (except construction)	34.4	22.4	-12.0
Operatives (except transport)	35.4	17.5	-17.9
Transport Equipment Operatives	13.2	9.0	-4.2
Laborers	20.9	15.2	-5.7
Cleaning, Food, Personal, and Protective Service Workers	84.3	88.9	+4.6
TOTAL	466.5	417.4	-49.1

Source: Center for Economic Analysis, University of Colorado at Boulder, Colorado History Data Files and Colorado Control Forecast (October, 1986)

Table 2

Years of School Completed, 1980 and 1970, for Colorado and U.S. Population 25 Years of Age and Older.

	COLORADO					U.S.				
	1980		1970		% CHANGE 1970 to 1980	1980		1970		% CHANGE 1970 to 1980
	N	%[1]	N	%		N	%	N	%	
Total Population Age 25 and Older	1,663,891	100	1,141,138	100	46	132,775,652	100	109,899,359	100	21
0 to 8 Years of Schooling	175,724	11	228,033	20	-23	24,370,124	18	31,087,390	28	-22
9 to 11 Years of Schooling	179,681	11	183,804	16	-2	20,320,142	15	21,285,922	19	-5
4 Years High School or GED	575,265	35	392,787	34	46	45,691,431	34	34,158,051	31	34
1-3 Years College	351,108	21	166,188	15	111	20,900,462	16	11,650,730	11	79
4 Years College	[382,013][2]	[23]	96,900	9	[124]	[21,593,443]	[16]	6,657,604	6	[84]
5+ Years College			73,526	6				5,059,662	5	

[1] Percents rounded to nearest whole percent; rounding error accounts for any differences between column runs and 100%.

[2] Fewer categories reported; bracketed data are for broader categories.

Sources: CO 1980 Census, Advance Estimates, pt. 7, Nov. 1982; CO 1970, Census Vol. 1, pt. 7, Table 46; U.S. 1980 Census, Provisional Estimates Supplementary Report, Table P-2; U.S. 1970 Census, U.S. Summary, Vol. 1, Pt. 1, Table 88.

Figure 11

1980 Census Counts of School Enrollment
for the Colorado Population, Age 3 and Older
by Education Sector and Level[1,2,3]

EDUCATION LEVELS	EDUCATION SECTORS (public)	EDUCATION SECTORS (private)	
(post-doctoral & advanced professional studies)	PUBLIC, POSTSECONDARY n enrolled: 156,857 % of row: 88% % of column: 22% % of TOTAL: 20%	PRIVATE, POSTSECONDARY n enrolled: 22,216 % of row: 12% % of column: 27% % of TOTAL: 3%	Sum, PS: 179,073 % of TOTAL: 22%
(high school)	PUBLIC, N.S. - 12th GRADE n enrolled: 562,539 % of row: 90% % of column: 78% % of TOTAL: 70%	PRIVATE, N.S.-12th GR. n enrolled: 59,479 % of row: 10% % of column: 73% % of TOTAL: 7%	Sum, N-12: 622,018 % of TOTAL: 78%
(nursery school)	Sum, Public: 719,396 % of TOTAL: 90%	Sum, Priv.: 81,695 % of TOTAL: 10%	TOTAL: 801,091 %: 100%

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[1] Source: U.S. Bureau of the Census, Chapter C, General Social & Economic Characteris:. Colorado, Table 66.

[2] To qualify as "enrolled" a person must have attended regular school or college betwee Feb. 1 & April 1, 1980. Regular school/college is defined by the Census Bureau to include nursery school, kindergarten, elementary school or schooling which leads to a high school diploma or college degree.

[3] Percents rounded to the nearest whole.

Chart prepared by S. Knop, 12/86.

Table 3a

Summary Table: Regional Distributions, Level of Schooling Completed by Colorado's Adult Household Population, Age 19 Years and Older, 1980 (in percents).

	≤ H.S.	H.S. Only	Some College	4+ Yrs. College	Total %	Total (n)
Statewide	20	33	26	21	100	(20,022)
Metro:	19	33	27	22	100	(16,068)
Denver Cty.	25	30	24	21	100	(3,769)
Rest, Den-Bldr SMSA	15	33	28	24	100	(7,537)
Other SMSAs	20	35	27	18	100	(4,762)
Non-metro:	25	34	24	17	100	(3,954)
West & Mtns.	19	33	27	20	100	(2,154)
East	29	39	19	12	100	(924)
South	35	31	22	12	100	(876)

Table 3b

Summary Table: Regional Distributions, School Enrollment Status of Colorado's Adult Household Population, Age 19 Years and Older, 1980 (in percents).

	Enrolled	Not Enrolled	Total %	Total (n)
Statewide	8	92	100	(20,022)
Metro:	9	91	100	(16,068)
Denver Cty.	8	92	100	(3,769)
Rest, Den-Bldr SMSA	8	92	100	(7,537)
Other SMSAs	10	90	100	(4,762)
Non-metro:	4	96	100	(3,954)
West & Mtns.	5	95	100	(2,154)
East	3	97	100	(924)
South	4	96	100	(876)

Source: 1980 Census, PUMs data tape. Table prepared by the Population Dynamics Project, CCHE.

Figure 12

Six Colorado Regions Used for Schooling and Enrollment Analysis